European Commission

SET PLAN TASK FORCES RECOMMENDATIONS

Executive Summary

An overview of all the recommendations developed by the five SET Plan Task Forces: Circularity and Materials Substitution, Research and Innovation for Societal Needs, Digitalisation, Skills, and Access to the Market.

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INTRODUCTION TO THE TASK FORCE RECOMMENDATIONS

Following the Communication on 'the revision of the Strategic Energy Technology (SET) Plan', five temporary Task Forces dedicated to cross-cutting topics were established:

CIRCULARITY AND MATERIALS SUBSTITUTION (TASK FORCE 1)

RESEARCH AND INNOVATION FOR SOCIETAL NEEDS (TASK FORCE 2)

DIGITALISATION (TASK FORCE 3)

SKILLS (TASK FORCE 4)

ACCESS TO THE MARKET (TASK FORCE 5)

The Task Forces each developed a set of 5-8 actionable recommendations for the SET Plan community, resulting in 29 recommendations in total. The Task Force recommendations encourage integrating cross-cutting topics into the SET Plan's work, thereby boosting progress on various European Union (EU) priorities.

The recommendations were created by the Task Force members, 25 independent experts (5 per Task Force), and the Task Force Leaders and Facilitators. Policy Officers of the European Commission (EC) had an observer role in the development of the recommendations. The recommendations were finalised based on Task Force meetings, written feedback from the Task Force, desk research, interviews and consultations with the wider SET Plan community[1].

Each Task Force recommendation specifies **why** action is needed, **what** solutions could address the identified challenges, and **how** they could be implemented. The full recommendations also indicate **who** the target audience is, when the recommendation should be implemented, and the **KPIs** that could be used to track progress.

The Task Force recommendations target key SET Plan stakeholders: primarily the Implementation Working Groups (**IWGs**), and the European Technology and Innovation Platforms (**ETIPs**), but also the European Energy Research Alliance (**EERA**), and the Clean Energy Transition Partnership (**CETP**). The recommendations can also be relevant for funding agencies of Member States. Implementation of the recommendations is encouraged to begin in 2026 and continue throughout 2027 until 2030. Progress can be monitored using the proposed KPIs.

This Executive Summary provides a synthesis of all recommendations across all Task Forces. For more information, please refer to the Task Force recommendation documents.

1 Consulted stakeholders were the Steering Group members, the IWG and ETIP (co-) Chairs, Secretariats, and the EC.

OVERVIEW OF ALL TASK FORCE RECOMMENDATIONS

CIRCULARITY AND MATERIALS SUBSTITUTION (TASK FORCE 1)

1. Generate circular principles and design criteria for energy technologies
2. Create guidelines for Life Cycle Assessments of energy technologies
3. Develop EU-level indicators and targets expressing different circularity strategies
4. Accelerate material substitution for SET Plan technologies through targeted research, development, and cross-sector collaboration
5. Strengthen the supply of circular materials for SET Plan technologies through targeted recycling R&D and infrastructure development
6. Stimulate demand for circular materials and components in SET Plan technologies

RESEARCH AND INNOVATION FOR SOCIETAL NEEDS (TASK FORCE 2)

1. Align SET Plan technological developments with societal needs
2. Enhance communication with and engagement of citizens and other societal stakeholders throughout all stages of the energy R&I process
3. Improve the affordability and accessibility of energy technologies and systems and enhance their contribution to the EU's resilience
4. Encourage equitable distribution of costs and benefits, and alignment with just energy transition principles
5. Maximise synergies between energy systems and other land uses and sectors to meet a variety of societal needs

DIGITALISATION (TASK FORCE 3)

1. Create common data infrastructures where data is accessible, leading to federated energy data spaces
2. Develop data sharing incentives for data holders
3. Create common interoperability standards for smart meters, leading to pan-European smart metering standards initiatives
4. Promoting common data structures and standardisation in the energy sector, leading to commong data models in energy
5. Expand European data hubs to host energy-related datasets
6. Develop a data prioritisation framework for the SET Plan
7. Develop a European energy data space rollout plan
8. Develop a European cyber resilience action plan

SKILLS (TASK FORCE 4)

1. Strengthen education-industry links in the energy sector and update curricula
2. Integrate digital and cross-disciplinary skills in all energy training
3. Scale-up upskilling and reskilling programmes for the current workforcein the energy sector
4. Harmonise European certification, qualification frameworks and skill standards
5. Promote inclusion and awareness of SET Plan technologies to attract talent

ACCESS TO THE MARKET (TASK FORCE 5)

1. Use and share knowledge from existing regulatory sandbox solutions for SET Plan technology innovations and develop new ones
2. Establish innovation hubs for SET Plan technologies
3. Design de-risking finance instruments and funding schemes
4. Include the financial actors in the SET Plan community to address specific investment needs
5. Collect and share best practices for the market uptake of European SET Plan technology innovations

TASK FORCE 1: CIRCULARITY AND MATERIAL SUBSTITUTION

The recommendations of the Task Force on 'Circularity and Material Substitution' relate to two distinct but often complementary concepts: circularity and material substitution. The recommendations aim to provide effective tools and methods to make SET Plan technologies more sustainable and resilient, and to develop advanced, high-performance materials that can serve as substitutes[IL4.1]. They also aim to maximise the use of existing materials, for example, through recycling and repair.

Recommendation 1: Generate circular principles and design criteria for energy technologies

Why: A large share of the environmental and resource impacts of SET Plan technologies is determined at the design stage through choices related to materials, durability, repairability, recyclability and energy efficiency. Although EU frameworks such as the Circular Economy Action Plan and the Ecodesign for Sustainable Products Regulation promote circularity, there is still a lack of harmonised, technology-specific guidance. As a result, many energy technologies remain difficult and costly to repair, refurbish or recycle.

What: This recommendation proposes the development of harmonised circular design principles and technology-specific criteria for SET Plan technologies. The criteria should support life extension, reuse, recyclability, modularity, reverse supply chains and reduced energy losses, while being adapted to the specific characteristics of different technologies and value chains.

How: Implementation should start with a stock-taking exercise to assess existing circularity-by-design practices and identify gaps across SET Plan technologies. Based on this, SET Plan stakeholders should jointly develop practical guidance and design criteria tailored to different technologies. The process should include regular updates, common sustainability terminology and monitoring of implementation through industry feedback and surveys.

Recommendation 2: Create guidelines for Life Cycle Assessments of energy technologies

Why: Current Life Cycle Assessments (LCAs) practices for SET Plan technologies are often fragmented, with inconsistent methodologies, limited data availability and low comparability between studies. These gaps make it difficult to assess sustainability, circularity and material substitution impacts in a reliable and harmonised way and limit informed decision-making for policy, investment and technology development.

What: This recommendation proposes the development of harmonised, energy technology-specific guidelines for conducting LCAs of SET Plan technologies. The guidelines should align with the Product Environmental Footprint framework and emerging EU standards. They should also support assessments of environmental, circularity and material substitution impacts across different technologies and value chains.

How: Implementation should involve cooperation between SET Plan stakeholders, the EC and standardisation bodies to identify data gaps, develop common methodologies and generate technology-specific guidance. Dedicated working groups, targeted research funding and improved life cycle inventory data generation should support the creation of harmonised benchmarks, datasets and assessment tools for SET Plan technologies.

Recommendation 3: Develop EU-level indicators and targets expressing different circularity strategies

Why: The transition to a circular energy system requires reliable methods to measure progress across technologies, value chains and governance levels. Currently, only limited indicators are available for tracking circularity within the EU energy system. Existing metrics often focus mainly on recycling rather than broader circular strategies such as prevention, reuse, repair and remanufacturing. This limits the ability to monitor progress, compare performance and guide policy and investment decisions effectively.

What: This recommendation proposes developing EU-level indicators and targets that capture the full range of circularity strategies within the R framework across SET Plan technologies (e.g. from 'Refuse' to 'Recover'). These indicators should also be specific to different life cycle phases, SET Plan technologies, and implementation levels (e.g. the EU and national levels, companies and households).

How: Implementation should involve a structured, collaborative process that brings together SET Plan stakeholders, EU institutions, industry, researchers, and national authorities. Existing frameworks and standards should serve as a basis for developing harmonised methodologies, supported by common data collection systems, pilot testing and integration into SET Plan monitoring and reporting frameworks. Regular reviews and digital tools should ensure indicators remain relevant as technologies and policies evolve.

Recommendation 4: Accelerate material substitution for SET Plan technologies through targeted research and development, and cross-sector collaboration

Why: Many SET Plan technologies, including batteries, photovoltaics, wind turbines and hydrogen systems, depend on critical and high-risk raw materials that are scarce, geopolitically sensitive or environmentally harmful to extract. Current approaches to material substitution are often fragmented across sectors, increasing supply risks and limiting the EU's ability to scale clean energy technologies sustainably and competitively.

What: This recommendation proposes accelerating material substitution across SET Plan technologies through targeted research, innovation and cross-sector collaboration. It focuses on identifying technology-specific substitution priorities, developing sustainable alternative materials, and strengthening cooperation among the energy, materials, chemical, and manufacturing sectors to reduce dependence on critical raw materials.

How: Implementation should begin with identifying priority materials for substitution within each technology area, supported by JRC studies and existing EU frameworks such as the Critical Raw Materials Act. Targeted R&D programmes, shared testing and innovation platforms, and dedicated cross-sector working groups should support the development and deployment of alternative materials. In parallel, policy measures, eco-design standards and market incentives should help accelerate industrial uptake and long-term adoption.

Recommendation 5: Strengthen the supply of circular materials for SET Plan technologies through targeted recycling R&D and infrastructure development

Why: Recycling rates for many critical raw materials used in SET Plan technologies remain low, while limited recycling infrastructure, insufficient recovery systems and fragmented value chains continue to hinder circularity. Valuable materials from batteries, PV modules, wind turbines and hydrogen systems are often lost at end of life, increasing dependence on primary raw materials and creating environmental and supply risks.

What: This recommendation proposes strengthening the supply of circular materials by expanding recycling, remanufacturing, and recovery capacities for SET Plan technologies. It focuses on improved material-flow mapping, targeted R&D for advanced recycling technologies, shared infrastructure, and digital collaboration tools to increase the recovery and reintegration of high-value secondary raw materials.

How: Implementation should start with identifying priority material streams and components with high recovery potential across SET Plan technologies. Targeted R&D, pilot recycling and remanufacturing facilities, and shared testing infrastructure should support the development of scalable recovery solutions. In parallel, digital platforms, training programmes, and policy measures promoting recyclability and the use of recycled materials should help strengthen circular value chains and market uptake across the EU.

Recommendation 6: Stimulate demand for circular materials and components in SET Plan technologies

Why: Despite growing interest in circular economy solutions, the uptake of reused, recycled and renewable materials in energy technologies remains limited. Higher costs, insufficient standards, fragmented value chains and low market confidence continue to restrict demand for circular materials and components across SET Plan technologies.

What: This recommendation proposes measures to stimulate demand for circular materials and components in SET Plan technologies through harmonised standards, certification schemes, incentives and targeted public procurement. The objective is to create a viable single market for circular solutions and strengthen the business case for recycled, remanufactured and renewable materials.

How: Implementation should involve cooperation among SET Plan stakeholders, industry, policymakers, and standardisation bodies to develop common standards, certification systems, and market incentives. Public procurement criteria, financial support mechanisms and awareness-raising activities should help increase market confidence and encourage wider adoption of circular materials across clean energy value chains.

TASK FORCE 2: R&I FOR SOCIETAL NEEDS

The recommendations of the Task Force on 'Research and Innovation (R&I) for societal needs' aim to better align SET Plan technological developments with societal needs. These needs encompass diverse requirements, wishes and expectations of citizens and other societal stakeholders. Integrating societal needs into technological development is expected to positively affect societal readiness, acceptance, and adoption of SET Plan technologies. The Task Force on 'R&I for societal needs' developed five recommendations. Recommendation 1 is overarching and mandatory, while recommendations 2 to 5 are thematic in nature.

Overall recommendation 1: Align SET Plan technological developments with societal needs

Why: Societal needs are, in various cases, still insufficiently integrated into the strategic planning of SET Plan technologies. Some groups have included Social Sciences and Humanities so far, but not all.

What: To address these challenges, core concepts such as societal needs, readiness, acceptance and adoption should be integrated in the work of the groups.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) set up a sub-group or establish other means of collaboration to cover expertise and resource gaps on societal needs; (2) identify the most relevant societal needs and Task Force recommendations for the group and set overall objectives; and (3) include references to societal needs in the Thematic Visions, SRIAs, IICs and CIIPs.

Guiding questions that can support groups, for example, include: 'What gaps exist in your group's expertise or resources from a societal needs perspective?' and 'Which overarching studies on societal needs would need to be undertaken to develop a better overview of the most relevant societal needs for your technology area?'.

Recommendation 2: Enhance communication with and engagement of citizens and other societal stakeholders throughout all stages of the energy R&I process

Why: Communication and engagement with citizens and societal stakeholders often remain inadequate in projects involving SET Plan technologies. This can negatively affect transparency, support, inclusiveness and trust in these technologies.

What: To address these challenges, well-designed stakeholder engagement processes, stakeholder mapping and inclusive communication should be widely mainstreamed.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) establish strategic priorities, collaborations and objectives for the implementation of the recommendation on stakeholder engagement and communication; and (2) make use of existing, or develop new publications, events and recommendations that support stakeholder engagement and communication for SET Plan technologies.

Guiding questions that can support groups, for example, include: 'Which stakeholder groups are involved in, or affected by, your SET plan technology area? What value does each group bring, and what level of power, interest, support do they have or require?' and 'Which existing or upcoming national or EU-level projects and programmes support, or could benefit from, a stronger focus on stakeholder communication and engagement?'.

Recommendation 3: Improve the affordability and accessibility of energy technologies and systems and enhance their contribution to the EU's resilience

Why: Energy affordability and accessibility of SET Plan technologies can remain challenging, especially for vulnerable groups, due to limited R&D support and crises amplifying affordability issues and lowering resilience

What: To address these challenges, existing knowledge and initiatives on energy poverty, accessibility, affordability and resilience should be integrated in the development of SET Plan technologies.

How: IWGs, ETIPs, EERA, and CETP are recommended to: (1) establish strategic priorities and collaborations for the implementation of the recommendation on affordability, accessibility and resilience in line with existing EU policy frameworks; and (2) make use of existing - or develop new - publications, events and recommendations that could support affordability, accessibility and resilience of SET Plan technologies.

Guiding questions that can support groups, for example, include: 'Which pillars of the Affordability Action Plan, the Citizen Energy Package, and the Affordable Housing Strategy are linked to your technology area, and could be acted upon?' and 'Which existing resources related to affordability, accessibility and resilience are already available and could be taken up or leveraged by your group?'.

Recommendation 4: Encourage equitable distribution of costs and benefits, and alignment with just energy transition principles

Why: Inequitable distribution of costs and benefits, negative impacts on host communities, and obstacles for energy communities can hinder fair energy deployment of SET Plan technologies.

What: To address these challenges, business models that promote equitable cost-benefit sharing and justice principles should be integrated into SET Plan technologies, and the creation and long-term operation of energy communities should be facilitated.

How: IWGs, ETIPs, EERA, and CETP are recommended to: (1) establish strategic priorities and collaborations for the implementation of the recommendation on equitable distribution and just transition; and (2) make use of existing - or develop - new publications, events and recommendations that could support the application of equitable distribution and just transition principles to SET Plan technologies.

Guiding questions that can support groups, for example, include: 'How are the costs and benefits of your SET Plan technology currently being shared among developers, host communities and other affected stakeholders?' and 'Which topics would benefit from stakeholder events and dialogue and which stakeholders would need to be brought together to make progress?'.

Recommendation 5: Maximise synergies between energy systems and other land uses and sectors to meet a variety of societal needs

Why: SET Plan technologies can cause negative effects on biodiversity and the environment, and harm economic, agricultural or aesthetic interests of stakeholders.

What: To address these challenges, environmental assessment plans should be executed, and multi-use approaches and hybrid installations, which account for different interests, should be encouraged.

How: IWGs, ETIPs, EERA, and CETP are recommended to: (1) establish strategic priorities and collaborations for the implementation of the recommendation on maximising synergies of energy systems with other land uses; and (2) make use of existing, or develop new publications, events and recommendations that could contribute to maximising synergies of energy systems with other land uses.

Guiding questions that can support groups, for example, include: 'What potential negative biodiversity and environmental impacts could arise from your technology area, and how could these be avoided, minimised or mitigated?' and 'Which resources would need to be developed to upscale hybrid SET Plan technologies?'.

TASK FORCE 3: DIGITALISATION

The recommendations of the Task Force on 'Digitalisation' aim to support the integration of digital technologies and seamless digital data flows across the energy sector. Digitalisation underpins the transformation of the European energy system, enabling secure data exchange, interoperability and cross-sectoral integration, each essential to accelerate the clean energy transition. The Task Force on 'Digitalisation' developed eight recommendations. The recommendations address common data infrastructures, data sharing incentives, smart meter interoperability, common data structures, European data hubs, data prioritisation, the European energy data space rollout, and cyber resilience.

Recommendation 1: Create common data infrastructures where data is accessible, leading to federated energy data spaces

Why: Energy data across Europe remains fragmented, largely inaccessible, and insufficiently exploited due to unclear data ownership, high digitalisation costs, confidentiality concerns, and cybersecurity risks.

What: This recommendation supports R&I activities contributing to the creation of common data infrastructures, enabling the gradual emergence of federated energy data spaces.

How: IWGs, ETIPs, EERA, and CETP are recommended to identify priority data needs, use cases and datasets, while also considering the recommendations from the Smart Energy Expert Group and the framework defined by the Common European Energy Data Space. SET Plan groups should promote collaborative research, pilots, and demonstration projects exploring secure and trusted data exchange across the energy value chain, including cross-sectoral integration with transport, agriculture, and buildings. These activities should support the development of data marketplaces, Artificial Intelligence (AI) tools, advanced analytics and digital twins, contributing to increased renewable energy integration and enhanced cross-sectoral energy system integration.

Recommendation 2: Develop data sharing incentives for data holders

Why: Despite rapidly growing volumes of energy data, much remains unshared due to confidentiality concerns, strategic positioning, underestimation of data value and a lack of digital skills.

What: This recommendation supports R&I actions aimed at identifying and testing data sharing incentives for data holders, enabling the development of data valorisation mechanisms within the energy sector.

How: IWGs, ETIPs, EERA, and CETP are recommended to explore approaches that demonstrate the value of shared energy data through collaborative projects, pilots, and knowledge exchange initiatives. This should include exploiting the portfolio of incentive mechanisms for data sharing and increasing awareness of the Data Act. They should also support the use and development of AI tools, digital twin applications, data marketplaces, and cross-sectoral data spaces. These activities should support the development of digital services that accelerate renewable energy integration, enable consumer participation, and improve the energy performance of buildings and distribution grids.

Recommendation 3: Create common interoperability standards for smart meters, leading to pan-European smart metering standards initiatives

Why: Europe's smart metering landscape remains deeply fragmented, with inconsistent adoption of standards, proprietary protocols and varying functionalities across Member States, limiting consumer empowerment and cross-border energy services.

What: This recommendation supports R&I activities that exploit common interoperable approaches for smart metering systems across Europe.

How: IWGs, ETIPs, EERA, and CETP are recommended to support activities that demonstrate how interoperable smart metering enables real-time access to energy information, facilitates demand response and flexibility markets, and supports the development of consumer-centric digital energy services. Through coordinated R&I actions, SET Plan groups can also explore how smart meter data can support renewable energy integration, reduce peak demand and improve efficiency across the European energy system.

Recommendation 4: Promote common data structures and standardisation in the energy sector, leading to common data models in energy

Why: The continued use of proprietary data formats and stand-alone data models across the European energy industry prevents end-to-end integration, raises costs, and blocks key applications such as grid integration of electric vehicles, digital twin deployment and real-time demand response.

What: This recommendation supports R&I activities that promote the use of common data structures within the energy sector, including shared energy data models to ensure semantic interoperability across electricity, heating, cooling, water, gas and e-mobility.

How: IWGs, ETIPs, EERA, and CETP are recommended to test interoperable data architectures through collaborative projects and cross-sector pilots. Herein they could rely on unified Application Programming Interfaces (APIs) to enable secure, standardised data exchange between platforms and stakeholders. Such efforts will improve data usability for digital energy applications and enable innovative services such as e-mobility solutions, smart building services, flexibility services and digital energy management tools. They can also facilitate system-wide initiatives involving the development of digital twins of energy networks and decentralised optimisation tools.

Recommendation 5: Expand European data hubs to host energy-related datasets

Why: Energy data across Europe remains siloed within national systems, hampered by poor interoperability, cybersecurity risks, data quality issues and dependence on non-European cloud infrastructure, undermining data sovereignty and cross-border cooperation.

What: This recommendation supports initiatives aimed at expanding European data hubs to host energy-related datasets. This includes the adoption of a Hub-of-Hubs architecture with standardised APIs to interconnect national and sectoral data hubs through a common framework. This approach should align with and contribute to the development of European energy data spaces, enabling the structured, interoperable integration of energy data at the EU level.

How: IWGs, ETIPs, EERA, and CETP are recommended to set up R&I activities and pilot projects that can help identify relevant datasets and demonstrate how interconnected data platforms improve data accessibility and usability. They can also promote collaboration and knowledge sharing to support greater renewable energy integration, the development of positive energy districts and advanced energy system management.

Recommendation 6: Develop a data prioritisation framework for the SET Plan

Why: The rapid proliferation of Internet of Things (IoT) networks and smart devices generates massive volumes of energy data, yet much remains unshared or indiscriminately shared, risking communication network overload while leaving high-value datasets underutilised for innovation and system optimisation.

What: This recommendation supports the development of a data prioritisation framework to identify and prioritise key datasets for sharing within the SET Plan ecosystem. This should include methodologies for classifying and ranking data by relevance and impact, ensuring that data-sharing efforts focus on high-value datasets relevant to renewable integration and energy system optimisation.

How: IWGs, ETIPs, EERA, and CETP are recommended to set up R&I activities and stakeholder engagement that promotes the use of AI-driven dynamic prioritisation approaches and define domain-specific use cases where relevant datasets are identified, analysed and prioritised. This will promote efficient and impactful data-sharing practices and help avoid unnecessary data flows that could overload communication networks or data storage systems.

Recommendation 7: Develop a European energy data space rollout plan

Why: The effective digitalisation of the energy sector faces critical challenges including fragmented and inconsistent data across systems, significant implementation costs, gaps in regulatory and market frameworks, and insufficient trust and incentives for data sharing among stakeholders.

What: This recommendation promotes activities supporting the development of a phased rollout plan for the European Energy Data Space, considering also the recommendations from the Smart Energy Expert Group and the framework defined by the Common European Energy Data Space.

How: IWGs, ETIPs, EERA, and CETP are recommended to foster projects focusing on high-impact cross-sectoral and cross-border use cases, such as coordination between Transmission and Distribution System Operators, e-mobility and demand response. Through R&I projects, demonstration activities, and stakeholder collaboration, these initiatives can test data-sharing mechanisms and digital solutions across energy sectors and Member States, promoting the design, testing, and validation of advanced AI-based, data-driven services and digital twin applications to optimise energy system planning and operation.

Recommendation 8: Develop a cyber resilience action plan

Why: The rapid digitalisation of the energy system creates significant new cybersecurity risks, with the proliferation of interconnected IoT devices, distributed energy resources and complex data platforms exposing the sector to an expanded threat landscape. Gaps in EU-wide standards and the inadequacy of traditional perimeter-based security models compound this challenge.

What: This recommendation promotes R&I activities contributing to a cyber-resilient architecture for digitalised energy systems, ensuring that future energy infrastructures are secure-by-design.

How: IWGs, ETIPs, EERA, and CETP are recommended to promote projects implementing a holistic defence-in-depth approach spanning from IoT devices and smart meters to substation automation systems, SCADA platforms and central control systems, with a strong focus on convergence of information and operational technology. Through collaborative projects, pilots and knowledge exchange, these SET Plan groups can foster the development and deployment of secure data models and trusted data-exchange frameworks, thereby strengthening the resilience and security of critical energy infrastructures.

TASK FORCE 4: SKILLS

The Task Force on 'Skills' developed recommendations on skills development in the energy sector. The recommendations focus on innovative teaching, learning, and training; digital skills; upskilling and reskilling; harmonising and refining recognition frameworks; and enhancing inclusion and attracting talent.

Recommendation 1: Strengthen education-industry links in the energy sector and update curricula

Why: Education pathways remain misaligned with the evolving needs of the energy sector, leading to skills shortages, uneven training standards and limited labour mobility. Weak collaboration between education providers and industry creates barriers for graduates and reduces the availability of job ready professionals.

What: The recommendation focuses on modernising higher education, vocational education and training and lifelong learning curricula, to reflect clean energy technologies, interdisciplinarity and systems thinking. It calls for a stronger and more systematic involvement of industry in curriculum design and delivery.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) further coordinate modernisation of curricula at all levels, and establish structured collaboration between the EC, national education ministries, industry bodies and academic institutions to deliver targeted reforms, apprenticeships and new programmes; (2) leverage on European initiatives including the Pact for Skills, the Data Union Strategy and the BUILD Up Skills initiative; and (3) facilitate transnational cooperation through the Clean Energy Transition Partnership to connect skills programmes across Member States.

Recommendation 2: Integrate digital and cross-disciplinary skills in all energy training

Why: Digitalisation of the energy system is outpacing workforce capabilities, creating gaps in AI, data, cybersecurity and system integration. Energy jobs increasingly require hybrid technical and digital skills, yet training remains fragmented and siloed.

What: This recommendation aims to embed digital literacy, AI, data management and system-level thinking into all energy education and training pathways. It promotes cross-disciplinary learning across technical, environmental and social domains.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) systematically incorporate digital competences on energy sector training across all levels and disciplines (e.g. data analytics, simulation software, IoT and AI) and support communities of practice that enable continuous upskilling of the workforce; (2) share digital resources and map existing initiatives to develop modular and personalised training programmes, building on academia and industry collaboration and the EERA Smart Grids Joint Programme; (3) mobilise Pillar 2 of the Affordable Energy Action Plan to accelerate the development of the full range of digital skills required across the energy system throughout its transition.

Recommendation 3: Scale-up upskilling and reskilling programmes for the current workforce in the energy sector

Why: Many workers in fossil fuel and related sectors have transferable skills, but lack clean energy and digital competences. Training new entrants is too slow to meet immediate labour demand on its own.

What: The recommendation calls for expanding targeted upskilling and reskilling programmes for the existing workforce, especially in declining sectors. It prioritises work- and simulation-based learning to ensure rapid, job-ready outcomes.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) launch targeted reskilling initiatives to retrain workers transitioning from fossil fuel industries, and equipping them with clean energy competences through apprenticeships, internships and simulation-based training; (2) engage all relevant stakeholders in capacity building, leveraging existing structures such as the Net Zero Industrial Academies, the InnoEnergy Skills Institute, the Energy Poverty Advisory Hub and a dedicated Smart Grid Academy to address immediate shortages arising from grid digitalisation; (3) develop innovative learning and training schemes in energy skills in the short term (2026-2027); and (4) establish structured links with national territorial just transition plans in the medium term (2027-2030).

Recommendation 4: Harmonise European certification, qualification frameworks and skill standards

Why: Fragmented certification systems limit labour mobility and slow SET Plan technology deployment across the Single Market. Employers often lack trust in qualifications issued in other Member States.

What: This recommendation seeks to establish common European definitions, certifications and qualification standards for key energy sector occupations. It promotes mutual recognition through EU frameworks such as the European Qualifications Framework and European Skills, Competences, Qualifications and Occupations.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) set up working groups to identify priority occupations and drive technical standardisation to contribute to the development of a common European competency standards for the energy sector in collaboration with the European Centre for the Development of Vocational Training, the European Training Foundation, the Joint Research Centre (JRC), and the European Committee for (Electrotechnical) Standardization; (2) promote mutual recognition of national certification schemes, with Member States encouraged to test, model or adopt proven frameworks, quality assurance practices and microcredentials; and (3) develop a European Sectoral Qualification Framework for energy, enhancing cross-border recognition, comparability and labour mobility across the SET Plan community.

Recommendation 5: Promote inclusion and awareness of SET Plan technologies to attract talent

Why: SET Plan technologies suffer from low visibility, gender imbalance and persistent perception challenges. Underrepresentation reduces the available talent pool and limits innovation.

What: This recommendation calls for EU-wide and national campaigns presenting SET Plan energy careers as inclusive, innovative and purpose-driven. It emphasises diversity, gender equality and equal access to skills development.

How: IWGs, ETIPs, EERA and CETP are recommended to: (1) launch EU-wide awareness campaign to enhance the attractiveness of clean energy careers, and tailored national and regional outreach campaigns supported by employment agencies, large-scale partnerships, and relevant EC directorates; (2) mobilise support, identify appropriate communication channels and expand reach across Member States at national, sectoral and regional levels; and (3) systematically promote gender balance through clear KPIs and targeted outreach, building on the Gender Equality Strategy 2026-2030 and ensuring that training and reskilling programmes embed gender equality as a structural objective.

TASK FORCE 5: ACCESS TO THE MARKET

The recommendations of the Task Force on 'Access to the Market' aim to provide effective tools and methods to address barriers hindering the access to market of SET Plan technologies. The development of new technologies is not an end goal in itself. Innovative SET Plan technologies must also achieve greater market uptake and, at some point, reach a level of competitiveness that contributes to energy policy goals. In this context, the recommended actions are expected to contribute to and stimulate both market uptake and market competitiveness of innovative SET Plan technologies, leading to more sustainable strategies and applications in a wider market.

Recommendation 1: Use and share knowledge from existing regulatory sandbox solutions for SET Plan technology innovations and develop new ones

Why: Regulatory frameworks often lag behind technological innovation, creating barriers to testing, validation and deployment of SET Plan technologies across fragmented national systems.

What: This recommendation promotes regulatory sandboxes allowing for the testing of innovative energy solutions in controlled environments, and enabling regulators to gather evidence for future policy adjustments.

How: The SET Plan community should set up an EU-level feedback loop mechanism on lessons learnt from existing regulatory sandboxes and create at least one new regulatory sandbox to address specific regulatory barriers and gaps for SET Plan technologies. This includes fostering collaboration between regulators, industry and research, enabling real-world testing environments, and creating structured knowledge-sharing platforms. In the short term, dedicated forums and internal knowledge exchange mechanisms should be set up, followed by the development of a common EU framework and new sandbox implementations by 2030. This should ensure long-term regulatory learning and harmonisation.

Recommendation 2: Establish Innovation Hubs for SET Plan technologies

Why: The transition from demonstration to commercial deployment remains hindered by fragmented infrastructures, high costs and limited support at higher TRLs.

What: This recommendation calls for Innovation Hubs for SET Plan technologies, which should be established as coordinated, one-stop-shop ecosystems that connect stakeholders across the value chain to co-develop, test and validate SET Plan technology innovations. These hubs will provide shared infrastructures such as pilot plants and living labs, support co-creation across sectors, and integrate financial, technical and regulatory services.

How: Initial feasibility studies and strategic mapping should be carried out in the short term, followed by deployment and network formation of hubs by 2030, enabling long-term scaling, replication and system integration across Europe.

Recommendation 3: Design de-risking finance instruments and funding schemes

Why: Innovative energy technologies face significant financing gaps - particularly in the transition from demonstration to market uptake - due to high risks, fragmented funding schemes and limited private investment.

What: This recommendation calls for a portfolio of targeted de-risking instruments and blended finance mechanisms. Herein public and private funding, guarantees, equity instruments and innovative business models should be combined. The portfolio could encourage better alignment of EU and national funding schemes, stronger engagement of financial institutions, and improved venture capital and risk-sharing instruments.

How: In the short to medium term, Member States and stakeholders should implement tailored financing approaches, while aligning with upcoming EU strategies such as the Clean Energy Investment Strategy and Scale-up Europe Fund, ensuring long-term improvements in financing ecosystems.

Recommendation 4: Include the financial actors in the SET Plan community to address specific investment needs

Why: Limited interaction between technology developers and financial stakeholders constrains investment flows and slows down the commercialisation of SET Plan technology innovations.

What: This recommendation supports the integration of banks, institutional investors, venture capital, and other financial stakeholders, as well as project developers into the SET Plan framework. Their involvement would ensure that investment strategies align with the financial realities and risk profiles of SET Plan technology innovations.

How: Structured engagement should be strengthened primarily through ETIPs by linking to existing investor networks and initiatives, including clear investment needs and plans within CIIPs, and fostering dialogue via platforms such as a newly established SET Plan Investor Council and dedicated sessions at the SET Plan Conference.

In the short- to medium-term, dedicated task forces or structured dialogues should be established to ensure continuous interaction with financial actors. In the longer term, this engagement should be embedded in SET Plan governance, ensuring sustained collaboration and alignment between innovation priorities and investment strategies.

Recommendation 5: Collect and share best practices for the market uptake of European SET Plan technology innovations

Why: The lack of structured knowledge on successful market uptake pathways limits the ability to replicate and scale SET Plan technology innovations across Europe.

What: This recommendation calls for the collection and sharing of best practices, covering the full innovation cycle from early-stage research to commercial deployment, including case studies, funding approaches and stakeholder collaboration models.

How: The recommendation should be implemented through a collaborative, centrally coordinated approach, with the EC hosting best practices via SETIS to ensure neutrality and long-term accessibility, while ETIPs and IWGs act as primary content providers, using a standardised case study framework.

In the short- to medium-term, coordination mechanisms and templates should be established; in the long term, this will create a robust knowledge base to support learning, replication and faster market uptake of SET Plan technologies.